

NORTH DAKOTA STATE DEPARTMENT OF HEALTH Air Pollution Control Program State Capitol Bismarck, North Dakota - 58501

PERMIT APPLICATION FORM AP 101 FUEL BURNING EQUIPMENT USED FOR INDIRECT HEATING

1.	NAME OF FIRM OR ORGANIZATION: AMOCO OIL	COMPANY	
2.	PLANT LOCATION: NORTH OF THE CITY OF I	MANDAN, ND	
3.	SOURCE IDENTIFICATION NUMBER (From Item 9, For	rm AP 100): 1	No. 1 Boiler
4.	EQUIPMENT MANUFACTURER'S INFORMATION:		
	MANUFACTURER'S NAME BABCOCK & WILCOX EQUIPMENT MODEL NUMBER NOT APPLICABLE	RATED CAPACITY - MAXIM	UM INPUT 180,000,000 (BTU/hr.)
5.	PURPOSE (If multipurpose, note percent in each	use category.)	
	SPACE HEAT	POWER GENERATION_	7%
	PROCESS HEAT 93%	OTHER (Specify)	
6.	TYPE OF COMBUSTION UNIT:		
	A. COAL	В.	FUEL OIL AND GAS
	☐ PULVERIZED ☐ SPREADER STOK	ER X	HORIZONTALLY FIRED
	General With Fly A Reinjection	on \square	TANGENTIALLY FIRED OTHER (Specify)
	Wet Bottom With Fly Ash Reinjection Wet Bottom Without Fly Ash Reinjection Wet Bottom Without Fly Ash Reinjection Wet Bottom		
7.	NORMAL SCHEDULE OF OPERATION:		
	HOURS PER DAY 24	WEEKS PER YEAR	52
፠	TOTAL HOURS PER YEAR 8760 Process Heat Includes Steam Stripping Steam Tracing Space Heating Turbine Driving Cat. Carrier Steam Regenerator Smothering Steam Cyclone Interstage Steam	PEAK SEASON Aug, .(Specify Months of	Sept, Oct Year)

8. TYPE AND QUANTITY OF FUEL USED FOR LAST CALENDAR YEAR

(Specify Year)

	PRIMARY FU	EL	STANDBY FUEL		
	Type (AS Quantity per year 423. (Specify of fuel\$1.89/)	Units)	Quantity per year 104,715 3b1 (Specify Units) Delivered Cost of fuel \$12.76/Bb1 (\$/Unit Quantity)		
PERCENT ASH (Solid Fuel Only) Max Min Avg	-		Wt % 0.070 0.004 0.017		
PERCENT SULFUR Max. Min. Avg.	Wt 9 2.74 0.28 1.43		Wt 9 2.46 1.08 1.66		
BTU PER UNIT (Specify) Max. Min. Avg.	946 824 890	Mol Wt 19.38 19.23 19.30	BTU/Eb1 6,080,000 5,910,000 6,020,000	°API 9.00 15.60 11.26	

9. MONTHLY FUEL USE FOR LAST CALENDAR YEAR 1976
(Specify Year)

		TITY		OUAN	TITY
	PRIMARY FUEL	STANDBY FUEL		PRIMARY FUEL	STANDBY FUEL
	Type GAS	Type OIL		Type GAS	Type_OIL_
	Units MMBTU	Units MMBTU		Units MMBTU	Units MMSTU
HTMOM	•		MONTH		
Jan.	23,435	53,852	July	42,588	55,975
Feb.	21,034	51,942	Aug.	43,59 9	52,899
Maren	18,428	55,236	Sept.	46 , 369	48,399
April	22,943	39,790	Oct.	36,728	67,543
May	30,300	45,306	Nov.	21,590	49,049
June	44,068	51,758	Dec.	20,912	58,636

		NTITY
	PRIMARY FUEL	STANDBY FUEL
	Type GAS	Type OIL
	Units MMBTU	Units MABTU
Maximum	87	103
Average	<u>4</u> 3	72

11. COMBUSTI	ON AIR	
☐ NATU	RAL DRAFT Y INDUCED Y FORCED PRESSURE 0.04 (1bs./sq.in.	OTHER (Specify)
12. STACK DA	ГА	
HEIGHT A	BOVE GRADE 100 GAS TEMPERATURE AT E	(degrees F. average)
INSIDE D	IAMETER AT EXIT 5.5 GAS VELOCITY AT EXIT	(feet per sec. average)
EXIT GAS	FLOW RATE, SCFM: AVERAGE 26,760 MAXIM	rum 44,611
ARE SAMP	LING PORTS AVAILABLE? Yes No 🗓 (If "Yes" describ	e) .
13. DESCRIBE	FUEL TRANSPORT AND STORAGE METHODS:	
F	UEL OIL	
_	Transport: Pumped thru pipeline to Power Stati	lon
	Storage: Come roof tanks	
<u>F</u>	JEL GAS	
. 17.	Transport: Pressured thru pipeline to Power St Storage: None	ation
14. IS ANY A (If "Yes	R CONTAMINANT CONTROL DEVICE USED IN CONJUNCTION WITH THIS EC a "GAS CLEANING EQUIPMENT," Form AP 109, must be completed as	QUIPMENT? Yes No [X]
15. STACK EM	SSIONS:	
7. 1		
POLLUTANT	QUANTITY Pounds Per Hour (Average)	QUANTITY Tons Per Year
Particulate	0 0.7	3.08
Sulfur Dioxid	, 0 218	927
Nitrogen Oxid	. ·	l i
MILIOGEN OXIG	71.64	314
Carbon Monoxi		31 ⁴
	de 0 0	
Carbon Monoxi	de 0 0	0 -
Carbon Monoxi Other (Specif BASIS FOR QUAL 16. IS THIS	TITIES LISTED ABOVE: O = FLUE GAS ORSAT & FUEL ANA E = ESTIMATED - AIR POLLUTION ENGINEERING TEM IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AN	O LYSIS MANUAL, USEPA AP-40 2ND ED. D REGULATIONS? Yes [7] No [7]
Carbon Monoxi Other (Specif BASIS FOR QUA) 16. IS THIS (If "No"	TITITIES LISTED ABOVE: O = FLUE GAS ORSAT & FUEL ANA E = ESTIMATED - AIR POLLUTION ENGINEERING TEM IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND A "COMPLIANCE SCHEDULE," Form AP 110 must be completed and a	O LYSIS MANUAL, USEPA AP-40 2ND ED. D REGULATIONS? Yes [] No [] ttached.)
Carbon Monoxi Other (Specif BASIS FOR QUA) 16. IS THIS (If "No"	TITIES LISTED ABOVE: O = FLUE GAS ORSAT & FUEL ANA E = ESTIMATED - AIR POLLUTION ENGINEERING TEM IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND A "COMPLIANCE SCHEDULE," Form AP 110 must be completed and a person submitting report MERBERT F. SIMONS TITLE T	O LYSIS MANUAL, USEPA AP-40 2ND ED. D REGULATIONS? Yes [] No [] ttached.)

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PERMIT APPLICATION FORM AP 101 FUEL BURNING EQUIPMENT USED FOR INDIRECT HEATING

1.	NAME OF FIRM OR ORGANIZATIO		IL COMPANY			
2.	PLANT LOCATION: NORTH OF	THE CITY OF I	GANDAN N.D.			
3.	SOURCE IDENTIFICATION NUMBER	R (From Item 9, Fo	orm AP 100):	2	No. 2 Boiler	
4.	EQUIPMENT MANUFACTURER'S IN	FORMATION:				
	MANUFACTURER'S NAME BABCOC	K & WILCOX	RATED CAPACITY	- MAXIM		
	EQUIPMENT MODEL NUMBER NOT	APPLICABLE			(BTU/hr.)	
5.	PURPOSE (If multipurpose, no	ote percent in eac	h use category.)		
	SPACE HEAT		POWER GENE	RATION_	7%	
*	PROCESS HEAT 93%		OTHER (Spe	cify)		
6.	TYPE OF COMBUSTION UNIT:					
	A. COAL			В.	FUEL OIL AND GAS	
	☐ PULVERIZED	SPREADER STO	KER	\triangle	HORIZONTALLY FIRED	
	☐ General	☐ With Fly	1ch		TANGENTIALLY FIRED	
	Dry Bottom	Reinjection			OTHER (Specify)	
٠		Without F:				
	Wet Bottom With Fly Ash	CYCLONE	л •			
	Reinjection	☐ HAND FIRED				
	Wet Bottom Without Fly Ash		£.3			•
	Reinjection	OTHER (Speci	.fy)			,
7.	NORMAL SCHEDULE OF OPERATION					
	HOURS PER DAY 2L		WEEKS DED VE		52	
		7	WEEKS PER YEA PEAK SEASON			
	TOTAL HOURS PER YEAR 8760		(Specify Mor			_
	rocess Heat Includes: Steam Stripping Steam Tracing Space Heating Turbine Driving Cat. Carrier Steam Regenerator Smothering Cyclone Interstage Ste	; Steam				

AP 101-1

8. TYPE AND QUANTITY OF FUEL USED FOR LAST CALENDAR YEAR___

1976 (Specify Year)

	PRIMARY F	FUEL	STANDBY FUEL		
	Type GAS Quantity per year 423 (Speci		Type OIL Quantity per year 104,77 (Specify		
	Delivered Cost of fuel \$1.8 (\$/Unit	9/1000 SCF Quantity)	Delivered Cost of fuel \$12.76/Bbl (\$/Unit Quantity)		
PERCENT ASH (Solid Fuel Only) Max. Min. Avg.	- - -		Wt % 0.070 0.004 0.017		
PERCENT SULFUR Max. Min. Avg.	Wt 4, 2.74 0.28 1.43		wt 4, 2,46 1.08 1.66		
BTU PER UNIT (Specify) Max. Min. Avg.	BTU/SCF 946 824 890	MOL WT 19.38 19.23 19.30	BTU/Bb1 6,080,000 5,910,000 6,020,000	9.00 15.60 11.26	

9. MONTHLY FUEL USE FOR LAST CALENDAR YEAR 1976 (Specify Year)

	QUAN			QUAN	TITY
	PRIMARY FUEL STANDBY FUEL			PRIMARY FUEL	STANDBY FUEL
	Type GAS	Type OIL		Type GAS	Type GAS
	Units MMBTU	Units MMBTU		Units MMBTU	Units_MABTU
нтиом			MONTH		
Jan.	23,435	53,852	July	42,588	55,975
Feb.	21,034	51,942	Aug.	48,599	52,899
March	18,428	55,236	Sept.	46,369	48,399
April	22,943	39,790	Oct.	36,728	67,543
May	30,300	45,306	Nov.	21,590	49,049
June	44,068	51,758	Dec.	20,912	58,636

	QUA	ПІТ
	PRIMARY FUEL	STANDBY FUEL
	Type GAS	Type OIL
	Units MMBTU	Units MMBTU
Maximum	87	103
Average	43	72

11. COMBUSTIC	N AIR	
☐ NATUR	AL DRAFT X INDUCED X FORCED PRESSURE 0. (1bs./sq.	OHER (Specify)
12. STACK DAT	Α .	
HEIGHT AB	OVE GRADE 100 GAS TEMPERATURE A	T EXIT 331 (degrees F. average)
INSIDE DI	AMETER AT EXIT 5.5 GAS VELOCITY AT E	XIT 32.2 (feet per sec. average)
EXIT GAS	flow rate, scfm: average 26,760 ma	ximum 44,611
ARE SAMPL	ING PORTS AVAILABLE? Yes No X (If "Yes" desc	ribe)
13. DESCRIBE	FUEL TRANSPORT AND STORAGE METHODS:	
	OIL Insport: Pumped thru pipeline prage: Cone roof tanks	
	nsport: Pressured thru pipeline rage: None	
14. IS ANY AIR (If "Yes"	CONTAMINANT CONTROL DEVICE USED IN CONJUNCTION WITH THIS a"GAS CLEANING EQUIPMENT," Form AP 109, must be completed	EQUIPMENT? Yes No X and attached.)
15. STACK EMIS	SIONS:	
POLLUTANT	QUANTITY Pounds Per Hour (Average)	QUANTITY Tons Per Year
Particulate	0 0.7 .70	3.08
Sulfur Dioxide	0 218	927
Nitrogen Oxides	E 71.64	314
Carbon Monoxide		0
Other (Specify)	-	-
16. IS THIS IT	ITIES LISTED ABOVE: O-= FLUE GAS ORSAT & FUEL ANAL E = ESTIMATED-AIR POLLUTION END US EPA AP-40 SND EM IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES A	GINEERING MANHOURS ED
(II NO a	"COMPLIANCE SCHEDULE," FOrm AP 110 must be completed and	attached.)
		TECHNICAL SUPERINTENDER
SICNATURE_	Hestaté dirions	
DATE 2	/17/77 pupur 662-71:	1 Q



PERMIT APPLICATION FORM AP 101 FUEL BURNING EQUIPMENT USED FOR INDIRECT HEATING

1.	NAME OF FIRM OR ORGANIZATIO	N: AMOCO OIL	COMPANY			
2.	PLANT LOCATION: NORTH OF	THE CITY OF I	MANDAN, ND			
3.	SOURCE IDENTIFICATION NUMBE	R (From Item 9, F	orm AP 100):	3 N	o. 3 Boil	ler
4.	EQUIPMENT MANUFACTURER'S IN	FORMATION:				
	MANUFACTURER'S NAME BABCOC	K & WILCOX	RATED CAPACITY	- MAXIM	UM INPUT_	175,000,000 (BTU/hr.)
	EQUIPMENT MODEL NUMBER NOT	APPLICABLE				
5.	PURPOSE (If multipurpose, no	ote percent in eac	ch use category.)		
	SPACE HEAT		POWER GENEI	RATION_	7%	
*	PROCESS HEAT 93%		OTHER (Spec	ify)		
6.	TYPE OF COMBUSTION UNIT:					
	A. COAL			В.	FUEL OIL	& GAS
	PULVERIZED	SPREADER STO	KER	\boxtimes	HORIZONTA	LLY FIRED
·.	General Dry Bottom Wet Bottom With Fly Ash Reinjection Wet Bottom Without Fly Ash Reinjection NORMAL SCHEDULE OF OPERATION		on Tly Ash		TANGENTIA OTHER (Sp	LLY FIRED ecify)
	HOURS PER DAY 24		WEEKS PER YEA	R	24	
×	TOTAL HOURS PER YEAR 4104 Process Heat Includes Steam Stripping Steam Tracing Space Heating Turbine Driving Cat Carrier Steam Regenerator Smothering	ag Steam	PEAK SEASON I (Specify Mon			
	Cyclone Interstage St Bloed Steam	eam				

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8. TYPE AND QUANTITY OF FUEL USED FOR LAST CALENDAR YEAR 1976

(Specify Year)

	PRIMARY F	UEL	STANDBY FUEL	
Type GAS Quantity per year 132.4 MM SCF (Specify Units) Delivered Cost of fuel \$ 1.89/1000 SCF (\$/Unit Quantity)			Type OIL Quantity per year 49.791 Bb1 (Specify Units) Delivered Cost of fuel \$12.76/Bb1 (\$/Unit Quantity)	
PERCENT ASH (Solid Fuel Only) Max. Min. Avg.	-		Wt. 9)
PERCENT SULFUR Max. Min. Avg.	Max. 2574% Min. 0.28		Vt.46 ⁹ 1.08 1.66	6
BTU PER UNIT (Specify) Max. Min. Avg.	310/SCF 916 824 890	MOL WT 19.38 19.23 19.30	BTU/Bbl 6,080,000 5,910,000 6,020,000	°API 9.00 15.60 11.26

9. MONTHLY FUEL USE FOR LAST CALENDAR YEAR 1976 (Specify Year)

	QUAN	TITY	T. 11	QUAN	TITY
	PRIMARY FUEL	STANDBY FUEL		PRIMARY FUEL	STANDBY FUEL
	Type_GAS	Type OIL		Type_ GAS	Type_OIL_
	Units MMETU	Units MABTU		Units MMBTU	Units_MMBTU
MONTH			МОИТН		
Jan.	23,435	53,852	July	-	-
Feb.	21,034	51,942	Aug.	-	-
March	18,428	55,236	Sept.	-	-
April	9,920	26,526	Oct.	2,448	4,502
May	-	-	Nov.	21,590	49,049
June	-	-	Dec.	20,912	58,636

10. HOURLY FUEL USE FOR LAST CALENDAR YEAR 1976
(Specify Year)

	QUAN	ТІТҮ
	PRIMARY FUEL	STANDBY FUEL
	Type GAS	Type OIL
	Units MABTU	Units MMBTU
Maximum	31.5	78.8
Average	25.7	73.0

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11								Ο.
	. COMBUSTION	AIR						
	☐ NATURA	L DRAFT	X INDUCED	▼ FORCED	PRESSURE 0. (1bs./	04 sq.in.)	OTHER (Specify)	
12	. STACK DATA							
	HEIGHT ABO		00 et)		GAS TEMPERATUR		338 egrees F. average)	
	INSIDE DIA	METER AT EXIT_	6.17 (feet)	dent of the control o	GAS VELOCITY AT		22.2 per sec. average)	
	EXIT GAS F	LOW RATE, SCFM	:	AVERAGE 23,3	00	MAXIMUM	44,305	
	ARE SAMPLI	NG PORTS AVAIL	ABLE? Ye	es No 🛆	(If "Yes" de	escribe)		
13	. DESCRIBE F	UEL TRANSPORT		METHODS:				
			sport:	Pumped thru Cone roof ta		Power St	ation	
		FUEL G		Pressured th	ru pipeline	to Power	Station	
				None				
		5001	age:]	None				
14	DIA VIA 21						NT? Yes I No IV	
14.	. IS ANY AIR (If "Yes" a	CONTAMINANT CO	ONTROL DEVIC		UNCTION WITH T	HIS EQUIPME	NT? Yes No 🔀 ached.)	
	. IS ANY AIR (If "Yes" a	CONTAMINANT CC a''GAS CLEANING	ONTROL DEVIC	CE USED IN CONJ	UNCTION WITH T	HIS EQUIPME	NT? Yes No 🔀 ached.)	
	(If "Yes" a	CONTAMINANT CC a''GAS CLEANING	ONTROL DEVIC	CE USED IN CONJ	UNCTION WITH T	HIS EQUIPME	ached.)	
. 15.	(If "Yes" a	CONTAMINANT CC a''GAS CLEANING	ONTROL DEVICE EQUIPMENT,	CE USED IN CONJ	UNCTION WITH T	HIS EQUIPME	OUANTITY Tons Per Year	ļ
PO1	(If "Yes" a	CONTAMINANT CC a''GAS CLEANING	ONTROL DEVICE EQUIPMENT,	CE USED IN CONJ " Form AP 109,	UNCTION WITH T	HIS EQUIPME	ached.) QUANTITY	
P01	(If "Yes" a	CONTAMINANT CO a"GAS CLEANING SIONS:	ONTROL DEVICE EQUIPMENT,	CE USED IN CONJ " Form AP 109,	UNCTION WITH T must be comple	HIS EQUIPME	QUANTITY Tons Per Year	
PO!	(If "Yes" a	CONTAMINANT CC a"GAS CLEANING SIONS:	ONTROL DEVICE EQUIPMENT,	CE USED IN CONJ " Form AP 109,	TUNCTION WITH T must be comple exercised to the complex of the com	HIS EQUIPME	QUANTITY Tons Per Year 1.47	
POI Par Sul	(If "Yes" a STACK EMISS LUTANT rticulate for Dioxide	CONTAMINANT CC a''GAS CLEANING SIONS: O O	ONTROL DEVICE EQUIPMENT,	CE USED IN CONJ " Form AP 109,	unction with to must be comple exerage) C.7 189	HIS EQUIPME	QUANTITY Tons Per Year 1.47 388	
PO! Par Sul	(If "Yes" a STACK EMISS LUTANT rticulate for Dioxide trogen Oxides	CONTAMINANT CC a''GAS CLEANING SIONS: O O	ONTROL DEVICE EQUIPMENT,	CE USED IN CONJ " Form AP 109,	cunction with to must be completed by the completed by th	HIS EQUIPME	QUANTITY Tons Per Year 1.47 388 138	
POI Par Sul Nii Car	(If "Yes" a STACK EMISS LUTANT rticulate trogen Oxides rbon Monoxide her (Specify)	CONTAMINANT CC a''GAS CLEANING SIONS: O O E	Pour	CE USED IN CONJ "FORM AP 109, QUANTITY nds Per Hour (A	UNCTION WITH T must be comple Verage) C.7 189 67 O - AT & FUEL Al	HIS EQUIPME ted and att	QUANTITY Tons Per Year 1.47 388 138 0	
PO! Par Su) Nit Car	(If "Yes" a STACK EMISS LUTANT reticulate for Dioxide trogen Oxides rbon Monoxide her (Specify) SIS FOR QUANT	CONTAMINANT CO B'GAS CLEANING SIONS: O O O E O ITIES LISTED AF	Pour BOVE: O = F E = F CE WITH ALL	CE USED IN CONJ "FORM AP 109, QUANTITY IN THE CAS ORS ESTIMATED AI US EPA	UNCTION WITH T must be comple verage) C.7 189 67 0 AT & FUEL AT R POLIUTION RUL	VALYSIS ENGINEER ED.	QUANTITY Tons Per Year 1.47 388 138 0 ING MANUAL JUATIONS? Yes [X] No	
PO! Par Su) Nit Car	(If "Yes" a STACK EMISS LUTANT reticulate for Dioxide trogen Oxides rbon Monoxide her (Specify) SIS FOR QUANT: IS THIS ITH (If "No" a	CONTAMINANT CO B'GAS CLEANING SIONS: O O O E O ITIES LISTED AF	Pour BOVE: O = F E = F CE WITH ALL CHEDULE, " F	CE USED IN CONJ "FORM AP 109, QUANTITY IN THE CAS ORS ESTIMATED—AI US EPA APPLICABLE AH	C.7 189 67 O AT & FUEL AT R POLLUTION RIL R POLLUTION RULE to be completed	WALYSIS ENGINEER ED and attache	QUANTITY Tons Per Year 1.47 388 138 0 ING MANUAL JUATIONS? Yes [X] No	
PO! Par Su) Ni1 Car	(If "Yes" a STACK EMISS LUTANT rticulate fur Dioxide trogen Oxides rbon Monoxide ner (Specify) SIS FOR QUANT: IS THIS ITT (If "No" a NAME OF PER	CONTAMINANT CO B'GAS CLEANING SIONS: O O E O ITIES LISTED AF EM IN COMPLIANCE SO	POUT BOVE: O = F E = E CE WITH ALL CHEDULE, " FE	CE USED IN CONJ "FORM AP 109, QUANTITY IN THE PRICE AS ORS ESTIMATED A I US EPA APPLICABLE AII ORM AP 110 DUST HERPERT E,	C.7 189 67 O AT & FUEL AT R POLLUTION RIL R POLLUTION RULE to be completed	VALYSIS ENGINEER ED. ES AND REGL and attache	QUANTITY Tons Per Year 1.47 388 138 0 - ING MANUAL DIATIONS? Yes M No	



NORTH DAKOTA STATE DEPARTMENT OF HEALTH Air Pollution Control Program State Capitol Bismarck, North Dakota - 58501

PERMIT APPLICATION FORM AP 101 FUEL BURNING EQUIPMENT USED FOR INDIRECT HEATING

1.	NAME OF FIRM OR ORGANIZATIO	N: AMOCO OIL CO	MPANY	
2.	PLANT LOCATION: NORTH OF			
3.	SOURCE IDENTIFICATION NUMBE			Crude Furnace
4.	EQUIPMENT MANUFACTURER'S IN MANUFACTURER'S NAME LUMMU	FORMATION:		JM INPUT 158,130,000 (BTU/hr.)
5.	EQUIPMENT MODEL NUMBER NOT PURPOSE (If multipurpose, no		e category.)	, and a
	SPACE HEAT		POWER GENERATION_	
	PROCESS HEAT 1009	<u> </u>		
	TYPE OF COMBUSTION UNIT: A. COAL PULVERIZED General Dry Bottom With Fly Ash Reinjection Wet Bottom Without Fly Ash Reinjection	SPREADER STOKER With Fly Ash Reinjection Without Fly As Reinjection CYCLONE HAND FIRED OTHER (Specify)	B.	FUEL OIL AND GAS HORIZONTALLY FIRED TANGENTIALLY FIRED OTHER (Specify)
	NORMAL SCHEDULE OF OPERATION HOURS PER DAY 24 DAYS PER WEEK 7 TOTAL HOURS PER YEAR 8750 Firing rate is related	WE	EKS PER YEAR AK SEASON *Decem Specify Months of	nber Year)
	Highest firing rate occ	urred in Dec 1976.	umoient temperat	ure.

8. TYPE AND QUANTITY OF FUEL USED FOR LAST CALENDAR YEAR

(Specify Year)

1976

	PRIMARY FU	EL	STANDBY FUEL	
	Delivered Cost of fuel \$1.77/	y Units)	Type OT. Quantity 69,216 per year (Specify Delivered Cost of fuel \$12.76	5 Bbl Units) 5/Bbl
PERCENT ASH (Solid Fuel Only) Max. Min. Avg.			Wt % 0.070 0.004 0.017	-
PERCENT SULFUR Max. Min. Avg.	Wt 89 2.61 4.25		Wt 9 2.46 1.08 1.66	
BTU PER UNIT (Specify) Max. Min. Avg.	BTU/SCF 952 715 834	Mol Wt 22.5 18.5 20.3	BTU/Bbl 6,080,000 5,910,000 6,020,000	API 9.00 15.60 11.29

9. HONTHLY FUEL USE FOR LAST CALENDAR YEAR 1976

(Specify Year)

	QUANTITY			QUANTITY		
	PRIMARY FUEL	STANDBY FUEL		PRIMARY FUEL	STANDBY FUEL	
	Type GAS	Type OIL		Type_GAS	Type OIL	
	Units MMBTU	Units MMBTU		Units MMBTU	Units MMBTU	
нтиом			MONTH			
Jan.	54,014	48,060	July	62,292	29,514	
Feb.	55,390	41,581	Aug.	64,344	33,281	
March	48,500	41,864	Sept.	64,994	32,314	
April	48,158	39,105	Oct.	67,432	34,979	
Мау	50,507	41,324	Nov.	61,281	39,986	
June	55,596	36,122	Dec.	65,145	43,551	

	QUANTITY		
	PRIMARY FUEL	STANDBY FUEL	
	Type GAS Units MMBTU	Type OIL Units MMBTU	
Maximum	87.6	64.6	
Average	79.4	52.6	

٠.			1/ 01 50
11. COMBUSTI	ON AIR		
X NATU	RAL DRAFT INDUCED F	FORCED PRESSURE (lbs./sq.in	OTHER (Specify)
12. STACK DAT	ГА		
HEIGHT A	BOVE GRADE 124 (feet)	GAS TEMPERATURE AT I	(degrees F. average)
INSIDE D	IAMETER AT EXIT 7.25 (feet)	GAS VELOCITY AT EXIT	(feet per sec. average)
EXIT GAS	FLOW RATE, SCFM: AVERAGE	28,334 MAXIN	TUM 31,339
ARE SAMPI	LING PORTS AVAILABLE? Yes	No X (If "Yes" describ	e)
14. IS ANY AI	FUEL TRANSPORT AND STORAGE METHODS OIL: Fuel Oil is stored in to furnace. GAS: Gas is pressured to furnace. R CONTAMINANT CONTROL DEVICE USED a"GAS CLEANING EQUIPMENT," Form AND ADDRESS AND ADDRE	n cone roof tanks and furnace - there is no	gas storage. QUIPMENT? Yes No
15. STACK EMI	SSIONS:		•
POLLUTANT	1	ANTITY Hour (Average)	QUANTITY Tons Per Year
Particulate	0	0.46	2.04
Sulfur Dioxide	0	553.	2429
Nitrogen Oxide	s E	37	161
Carbon Monoxid	e O	0	0
Other (Specify		-	-
16. IS THIS IT (If "No" a NAME OF PR	AP-40 FEM IN COMPLIANCE WITH ALL APPLICAS "COMPLIANCE SCHEDULE," Form AP 11	TED FROM USEPA AIR PO 2ND ED. BLE AIR POLLUTION RULES AND 10 must be completed and at	DECHNICAL SUPERINTENDENT
	o emissions are 4.19 lb/MAB Fring devices located in clo	TU for this furnace, ose proximity under co	however it is one of herelontrol of the same correct.



PERMIT AFPLICATION FORM AP 101 FUEL BURNING EQUIPMENT USED FOR INDIRECT HEATING

1. NAME OF FIRM OR ORGANIZATI	ION: AMOCO OTH CO	
2. PLANT LOCATION: NORTH	OF THE CITY OF MAND	AN, MD
3. SOURCE IDENTIFICATION NUMBER	SER (From Item 9, Form AP	100): 5 Ultraformer F-100
4. EQUIPMENT MANUFACTURER'S I		CAPACITY - MAXIMUM INPUT 19,000,000
EQUIPMENT MODEL NUMBER NO 5. PURPOSE (If multipurpose,	APPLICABLE	(STU/hr.)
SPACE HEAT	•	POWER GENERATION
		OTHER (Specify)
TYPE OF COMBUSTION UNIT:		
A. COAL		B. FUEXXXXX FUEL GAS
PULVERIZED	SPREADER STOKER	HORIZONTALLY FIRED
☐ General ☐ Dry Bottom	With Fly Ash Reinjection	☐ TANGENTIALLY FIRED ☑ OTHER (Specify) VERTICALLY FIRED
Wet Bottom With Fly Ash Reinjection	☐ Without Fly Ash Reinjection ☐ CYCLONE	VERTICALLI FIRED
Wet Bottom Without Fly Ash Reinjection	☐ HAND FIRED ☐ OTHER (Specify)_	
. NORMAL SCHEDULE OF OPERATIO	CN:	
HOURS PER DAY 24	WES	KS PER YEAR 52
	PEA	k SEASON March
TOTAL HOURS PER YEAR 876	(9	pecify Months of Year)
		ted by feed rate more than by ambien served in March, 1976.

AP 101-1

THE MOSTH DAYOTE ARCOVERS

8. TYPE AND QUANTITY OF FUEL USED FOR LAST CALENDAR YEAR 1976

(Specify Year)

	PRIMARY FUEL	STANDBY FUEL
	Type CAS Quantity per year 345 125CF (Specify Units) Delivered Cost of fuel \$1.C6/1000 SCF (\$/Unit Quantity)	Type NONE Quantity per year (Specify Units) Delivered Cost of fuel (3/Unit Quantity)
PERCENT ASH (Solid Fuel Only) Max. Min. Avg.	- -	
PERCENT SULFUR Max. Min. Avg.	less than .02 WT %	
BTU PER UNIT (Specify) Max. Min. Avg.	ETU/SCF MOL WT 618 10.0 373 5.0 499 7.5	

9. MONTHLY FUEL USE FOR LAST CALENDAR YEAR 1976
(Specify Year)

		TITY		QUANT	TTY
	PRIMARY FUEL	STANDBY FUEL		PRIMARY FUEL	STANDJY FUEL
	Type GAS	Type_NONE		Type GAS	NONE Type
	Units_MMBTU	Units		Units MMBTU	Units
нтиом			MONTH		
Jan.	13691	-	July	14091	
Feb.	14736	·	Aug.	15487	
March	15636		Sept.	13558	
April	14832		Oct.	12492	
Мау	15349		Nov.	13787	
June	15297		Dec.	13323	

	QUA	YTITY
	PRIMARY FUEL Type GAS	STANDBY FUEL NONE Type
	Units	Units
Maximum	21.3	
Average	19.0	

11. COMBUSTION	AIR				
NATURA	L DRAFT	INDUCED [FORCED PRES	SURE	OTHER
				(lbs./sq.in.)	(Specify)
12. STACK DATA	l				
HEIGHT ABO			-GAS	TEMPERATURE AT EXT	
	(feet)				(degrees F. average)
INSIDE DIA		3.25 feet)	GAS 1	/ELOCITY AT EXIT	34; cet per sec. average)
EXIT GAS F	LOW RATE, SCFM:	AVEF	age 5586	MAXIMUM	
ARE SAMPLI	NG PORTS AVAILABLE	? Yes 🗌	№ 🛛 (1	f "Yes" describe)	
			•		
		•			
3. DESCRIBE F	UEL TRANSPORT AND	STORAGE METH	ODS:		
Fuel gas	is pressured	thru a pir	eline to th	e furnace. Th	ere are no gas
	facilities.				ore are no gas
4. IS ANY AIR (If "Yes" a	CONTAMINANT CONTRO GU'GAS CLEANING EQU'	IPMENT," For	m AP 109, must	be completed and	IPMENT? Yes No X attached.)
5. STACK EMISS	SIONS:				
			2(11)5: *m/		
OLLUTANT		Pounds P	QUANTITY er Hour (Avera	ge)	QUANTITY Tons Per Year
articulate	0			0	0
ulfur Dicxide	0		less	than .32	less than 1.4
itrogen Oxides	E			1.2	5.2
arbon Monoxide	0			0	0
ther (Specify)				-	-
ASIS FOR QUANTI	ITIES LISTED ABOVE	· O = FUEL	GAS ORSAT	& FUEL ANALYST	3
		E = ESTI	MATED FROM	AIR POLLUTION	ENGINEERING MANUAL
6. IS THIS ITE	EM IN COMPLIANCE W.	ITH ALL APPL	A AP-40 2ND ICABLE AIR POL P 110 must be	LUTION RULES AND !	REGULATIONS? Yes 7 %?
	RSON SUBMITTING RE				HNICAL SUPT.
SIGNATURE	H:1-7-5			· · · · · · · · · · · · · · · · · · ·	
****	11993.1	Liana		1 1)
DATE	February 25, 19) (!	PHO	NE 663-7410	3

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PERMIT APPLICATION FORM AP 101 FUEL BURNING EQUIPMENT USED FOR INDIRECT HEATING

1.	NAME OF FIRM OR ORGANIZATIO	N: AMOCO OIL	COMPANY	
2.	PLANT LOCATION: NORTH OF	THE CITY OF MAN	DAN, ND	
3.	SOURCE IDENTIFICATION NUMBER	R (From Item 9, For	m AP 100): 6 у	ltraformer Fl.2,3 & 4
4.	EQUIPMENT MANUFACTURER'S IN			
5.	EQUIPMENT MODEL NUMBER NOT PURPOSE (If multipurpose, no	r APPLICABLE	_	XIMUM INPUT 54,300,000 (BTU/hr.)
	SPACE HEAT		POWER GENERATION	ON
	PROCESS HEAT 100%		OTHER (Specify))
6.	TYPE OF COMBUSTION UNIT:			
	A. COAL		1	B. XHOEKXOOK FUEL GAS
	☐ PULVERIZED	SPREADER STOKE	ER	☐ HORIZONTALLY FIRED
	General Dry Bottom Wet Bottom With Fly Ash	With Fly As Reinjection Without Fly Reinjection CYCLONE	r Ash	TANGENTIALLY FIRED XX OTHER (Specify) VERTICALLY
	Reinjection Wet Bottom Without Fly Ash Reinjection	HAND FIRED OTHER (Specif	(بر ن	
.	NORMAL SCHEDULE OF OPERATION	·		_
	HOURS PER DAY 24		WEEKS PER YEAR	72
	DAYS PER WEEK 7		PEAK SEASON Dec	ember, 1976
	TOTAL HOURS PER YEAR 8760		(Specify Months	of Year)
	Furnace demand related	to severity of	reaction and ch	arge rate

10 101-1

8. TYPE AND QUANTITY OF FUEL USED FOR LAST CALENDAR YEAR 1976

(Specify Year)

	PRIMARY FUEL	STANDBY FUEL NONE
	Type GAS Quantity 989.7 MMSCF (Specify Units) Delivered Cost of fuel \$1.06/1000 SCF (\$/Unit Quantity)	Quantity per year (Specify Units) Delivered Cost of fuel (\$/Unit Quantity)
PERCENT ASH (Solid Fuel Only) Max. Min. Avg.	- - -	·
PERCENT SULFUR Max. Min. Avg	less than .02 Wt %	
BTU PER UNIT (Specify) Max. Min. Avg.	RTU/SCF MOL WT 618 10.0 378 5.0 499 7.5	

9. MONTHLY FUEL USE FOR LAST CALENDAR YEAR 1976
(Specify Year)

QUANTITY				QUANTITY		
	PRIMARY FUEL TypeGAS	STANDBY FUEL NONE Type		PRIMARY FUEL Type GAS	STANDBY FUEL NONE Type	
	Units MMBTU	Units		Units MMBTU	Units	
MONTH	•		HTMOM			
Jan.	41671		July	37354	٠,	
Feb.	40777		Aug.	40493		
larch	42956		Sept.	38152		
April	38744		Oct.	36878	,	
May	40842		Nov.	44301		
June	40645		Dec.	51032		

	QUANTITY				
	PRIMARY FUEL STANDBY FUEL				
	Type GAS	TypeNONE			
	Units <u>MMBIU</u>	Units			
Maximum	68.6				
Average	56.2				

11. COMBUSTIC	N AIR	
NATUR	AL DRAFT INDUCED FORCED PRESSURE	OTHER
	(lbs./sq.in	
12. STACK DAT	'A	
HEIGHT AB	OVE GRADE 100 GAS TEMPERATURE AT 1	
	(feet)	(degrees F. average)
INSIDE DI	AMETER AT EXIT 7 GAS VELOCITY AT EXIT	20.8 (feet per sec. average)
EXIT GAS	FLOW RATE, SCFM: AVERAGE 16,020 MAXIN	им 19,526
	ING PORTS AVAILABLE? Yes No X (If "Yes" describ	
	in the contract of the contrac	ς,
	·	
	•	
13. DESCRIBE	FUEL TRANSPORT AND STORAGE METHODS:	
Fuel ga	s is pressured to furnace via pipeline.	
inere a.	re no fuel gas storage facilities.	
× .		
14. IS ANY AIR	CONTAMINANT CONTROL DEVICE USED IN CONJUNCTION WITH THIS EQ	UIPMENT? Yes \ No \ \
(If "Yes"	a"GAS CLEANING EQUIPMENT," Form AP 109, must be completed an	d attached.)
15. STACK EMIS	SIONS:	
POLLUTANT	QUANTITY Pounds Per Hour (Average)	QUANTITY Tons Per Year
Particulate	0	O
Sulfur Dioxide	0 less than 0.94	less than 4.1
Nitrogen Oxides		
Carbon Monoxide	0	14.8
Other (Specify)	0	0
	TIES LISTED ABOVE: 0 = FLUE GAS ORSAT AND FUEL ANALYS	
	F - FUTTIMED ATT DOTTIMENT TO	
16. IS THIS ITE (If "No" a	US EPA AP-40 RID ED. WE HAVE AP-40 RID ED. WE HAVE APPLICABLE AND POLLUTION RULES AND MOUNT OF SCHEDULE," Form AP 110 must be completed and act	PECIFIATIONS V. TO V
	***************************************	ECHNICAT, SUPT.
SIGNATURE	Harist & Suna -	OUL 1.
-	mary 25 1977 move 663-7418	



PERMIT APPLICATION FORM AP 101 FUEL BURNING EQUIPMENT USED FOR INDIRECT HEATING

1.	NAME OF FIRM OR ORGANIZATION	N: AMOCO OIL C	0			
2.	PLANT LOCATION: NORTH	OF THE CITY OF	MANDAN, ND			
3.	SOURCE IDENTIFICATION NUMBER	R (From Item 9, For	m AP 100):	7 U	ltraformer	Regeneration
4.	EQUIPMENT MANUFACTURER'S INF MANUFACTURER'S NAME BORN EX		ATED CAPACITY	- MAXIM	UM INPUT 1.	,750,000 BTU/hr.)
	EQUIPMENT MODEL NUMBER NOT	APPLICABLE				
5.	PURPOSE (If multipurpose, no	te percent in each	use category.)		
	SPACE HEAT		POWER GENE	RATION_		
	PROCESS HEAT 100%					
6.	A. COAL PULVERIZED General Dry Bottom Wet Bottom With Fly Ash Reinjection Wet Bottom Without Fly Ash Reinjection	SPREADER STOKE With Fly As Reinjection Without Fly Reinjection CYCLONE HAND FIRED OTHER (Specif	sh 1 · 7 Ash 1	X	HORIZONTALL TANGENTIALL OTHER (Spec	Y FIRED Y FIRED ify)
•	NORMAL SCHEDULE OF OPERATION: HOURS PER DAY DAYS PER WEEK TOTAL HOURS PER YEAR 3186		WEEKS PER YEA PEAK SEASON (Specify Mon			
ĸ	This furnece (F5) heats		<i>-</i>			

This furnace (F5) heats air or inert gas during regeneration of Ultraformer reactors. Its operation is intermitant and depends on regeneration requirements.

8. TYPE AND QUANTITY OF FUEL USED FOR LAST CALENDAR YEAR 1976
(Specify Year)

	PRIMARY FUEL	STANDBY FUEL NONE
	Type GAS Quantity 11.17 MMSCF per year (Specify Units) Delivered Cost of fuel \$1.06/1000SCF (\$/Unit Quantity)	Type Quantity per year (Specify Units) Delivered Cost of fuel (\$/Unit Quantity)
PERCENT ASH (Solid Fuel Only) Max. Min. Avg.	- - -	
PERCENT SULFUR Max. Min. Avg.	LESS THAN .02 WT%	
BTU PER UNIT (Specify) Max. Min. Avg.	ETU/SCF MOL WT 618 10.0 378 5.0 499 7.5	·

9. MONTHLY FUEL USE FOR LAST CALENDAR YEAR 1976
(Specify Year)

QUANTITY				QUANT	TITY
	PRIMARY FUEL	STANDBY FUEL NONE		PRIMARY FUEL	STANDBY FUEL
	Type GAS	Туре		Type GAS	Type NONE
	Units MMBTU	Units		Units MMBTU	Units
МОМТН			MONTH		
Jan.	158		July	189	
Feb.	0		Aug.	1102	
March	157		Sept.	. <i>7</i> 88	:
April	0		Oct.	661	. 1
Мау	158		Nov.	1229	
June	0		Dec.	1134;	

	QUAN	TITY		
	PRIMARY FUEL STANDBY FUEL NONE Type GAS Type Units MMBTU Units			
Maximum	1.75			
Average	1.75			

11. COMBUSTION	i AIR				
X NATURA	AL DRAFT INI	DUCED FOR	CED PRESSURE	lbs./sq.in.)	OTHER (Specify)
12. STACK DATA	l				
HEIGHT ABO	OVE GRADE 50 (feet)		GAS TEMPER	RATURE AT EXIT	900 legrees F. average)
INSIDE DIA	AMETER AT EXIT 1.6	65 et)	GAS VELOCI	TY AT EXIT	11.4 per sec. average)
EXIT GAS F	FLOW RATE, SCFM:	AVERAGE	498	MAXIMUM_	498
ARE SAMPLI	ING PORTS AVAILABLE?	Yes No	☐ (If ''Ye	s" describe)	
			•		
		•			
13. DESCRIBE F	UEL TRANSPORT AND ST	ORAGE METHODS:			
Fuel gas	is pressured to	furnace via	pipeline -	There is no	fuel gas
storage.					
					•
4. IS ANY AIR (If "Yes" a	CONTAMINANT CONTROL a''GAS CLEANING EQUIPM	DEVICE USED IN (CONJUNCTION WI	TH THIS EQUIPME empleted and att	ENT? Yes No Kached.)
S. STACK EMISS	SIONS:			una in tari	
OLLUTANT		QUANT: Pounds Per Hour			QUANTITY Tons Per Year
articulate	0			0	0
ulfur Dioxide	0		less than	1.01	ess than .05
itrogen Oxides	E			.11	.18
arbon Monoxide	0			0	0
ther (Specify)	0	7.00		-	_
ASIS FOR QUANT	ITIES LISTED ABOVE: (E = ESTJMATED	. AIR FOLIA	TION ENGINEE	RING MANUAL
6. IS THIS ITE (If "No" a	EM IN COMPLIANCE WITH "COMPLIANCE SCHEDULE	H ALL APPLICABLE	AIR POLLUTION THE COMPLET OF COMPLET	N RULES AND REGU	ULATIONS? Yes 📝 No
NAME OF PE	RSON SUBMITTING REPOR		. SIMONS	TITLE TECHNI	CAL SUPT.
SIGNATURE_	Hacet fer	13.50-			
DATE Febr	ruary 23, 1977		PHONE	663-7418	



PERMIT APPLICATION FORM AP 101 FUEL BURNING EQUIPMENT USED FOR INDIRECT HEATING

2. PLANT LOCATION: NORTH OF CITY OF MANDAN, ND 3. SOURCE IDENTIFICATION NUMBER (From Item 9, Form AP 100): 8 Alkylation Unit FN 4. EQUIPMENT MANUFACTURER'S INFORMATION: MANUFACTURER'S NAME FOSTER WHEELER CORP RATED CAPACITY - MAXIMUM INPUT 85,400 (BTU/hr. EQUIPMENT MODEL NUMBER NOT APPLICABLE 5. PURPOSE (If multipurpose, note percent in each use category.) SPACE HEAT POWER GENERATION PROCESS HEAT 100% OTHER (Specify) 6. TYPE OF COMBUSTION UNIT: A. COAL B. FUEL OIL PULVERIZED SPREADER STOKER MICH HORIZONTALLY FIRE General With Fly Ash Reinjection OTHER (Specify) Without Fly Ash Reinjection Without Fly Ash Reinjection With Bottom Without Fly Ash Reinjection OTHER (Specify) Wet Bottom HAND FIRED OTHER (Specify) Wet Bottom Without Fly Ash Reinjection OTHER (Specify) Wet Bottom Without Fly Ash Reinjection OTHER (Specify) Wet Bottom Without Fly Ash Reinjection OTHER (Specify)	
4. EQUIPMENT MANUFACTURER'S INFORMATION: MANUFACTURER'S NAME FOSTER WHEELER CORP FATED CAPACITY - MAXIMUM INPUT 85,400 (BTU/hr. EQUIPMENT MODEL NUMBER NOT APPLICABLE 5. PURPOSE (If multipurpose, note percent in each use category.) SPACE HEAT POWER GENERATION PROCESS HEAT 100% OTHER (Specify) 6. TYPE OF COMBUSTION UNIT: A. COAL B. FUEL OIL PULVERIZED SPREADER STOKER HORIZONTALLY FIRE General With Fly Ash Reinjection OTHER (Specify) Without Fly Ash Reinjection With Fly Ash Reinjection With Fly Ash Reinjection With Fly Ash Reinjection With Fly Ash Reinjection Wet Bottom HAND FIRED OTHER (Specify) VERTICALLY FIRE	
MANUFACTURER'S NAME FOSTER WHEELER CORP RATED CAPACITY - MAXIMUM INPUT 85,400 (BTU/hr. EQUIPMENT MODEL NUMBER NOT APPLICABLE 5. PURPOSE (If multipurpose, note percent in each use category.) SPACE HEAT POWER GENERATION PROCESS HEAT 100% OTHER (Specify) 5. TYPE OF COMBUSTION UNIT: A. COAL B. FUEL OIL PULVERIZED SPREADER STOKER HORIZONTALLY FIRE General With Fly Ash Reinjection OTHER (Specify) Without Fly Ash Reinjection With Fly Ash Reinjection With Fly Ash Reinjection With Fly Ash Reinjection With Fly Ash Reinjection Wet Bottom HAND FIRED OTHER (Specify) WERTICALLY FIRE OTHER (Specify) VERTICALLY FIRE	Furraces
SPACE HEAT POWER GENERATION PROCESS HEAT 100% OTHER (Specify) 5. TYPE OF COMBUSTION UNIT: A. COAL B. FUEL OIL PULVERIZED SPREADER STOKER HORIZONTALLY FIRE General With Fly Ash Reinjection OTHER (Specify) Without Fly Ash Reinjection OTHER (Specify) With Fly Ash Reinjection OTHER (Specify) Wet Bottom HAND FIRED OTHER (Specify) WERPICALLY FIRE VERFICALLY FIRE VERFICALLY FIRE	
A. COAL PULVERIZED SPREADER STOKER HORIZONTALLY FIRE TANGENTIALLY FIRE TANGENTIALLY FIRE OTHER (Specify)	
General With Fly Ash Reinjection OTHER (Specify) Wet Bottom Without Fly Ash Reinjection C. FUEL GAS Wet Bottom HAND FIRED WERFICALLY FIRED WE	
□ Dry Bottom □ Without Fly Ash Reinjection □ With Fly Ash Reinjection □ HAND FIRED □ WERFICALLY FIR OTHER (Specify) Reinjection □ OTHER (Specify) OTHER (Specify) OTHER (Specify) OTHER (Specify)	RED
	fy)
NORMAL SCHEDULE OF OPERATION: HOURS PER DAY 24 WEEKS PER YEAR 52 DAYS PER WEEK 7 * PEAK SEASON Jan. Feb. March. (Specify Months of Year)	

^{*} Furnace demand more related to unit charge rate than to season of the year

	PRIMARY	FUEL	STANDBY FUEL	*
·	Quantity per year 97 (Spec		Quantity per year 145	IL PO Bbl fy Units)
		.38/1000 SCF		Quantity)
PERCENT ASH (Solid Fuel Only) Max. Min. Avg.	- -			- 0
PERCENT SULFUR Max. Min. Avg.	3.54 1.95			-
BTU PER UNIT (Specify) Max. Min. Avg.	BTU/SCF 775 525 651	MOL WT 18.1 3.5 13.3	MM BTU/B51 - - 4.35	GRAVITY - 22.3°API

* ACID SOLUBLE OIL, A BY PRODUCT OF CATALYST (HF) REGENERATION .

9. MONTHLY FUEL USE FOR LAST CALENDAR YEAR 1976
(Specify Year)

	QUAN	TITY		QUAN'	TITY
	PRIMARY FUEL	STANDBY FUEL		PRIMARY FUEL	STANDBY FUEL
	Type GAS	Type <u>CIL</u>		Type GAS	Type OIL
	Units MMBTU	Units MMBTU		Units MMBTU	Units MMBTU
MONTH			нолтн		
Jan.	64,009	498	July	47,771	517
Feb.	62,612	593	Aug.	48,728	602
March	62,325	612	Sept.	39,903	459
April	53,753	536	Oct.	43,351	445
Мау	53,226	478	Nov.	51,896	574
June	47,497	538	Dec.	57,808	632

1976 10. HOURLY FUEL USE FOR LAST CALENDAR YEAR

(Specify Year)

	QUA	πITY
	Type GAS Units 17-BTU	STANDBY FUEL Type OIL Units MMBTU
Maximum	90	.85
Average	72	.74

				59 51 (
11. COMBUSTIO	N AIR			
🔀 NATUR	AL DRAFT		. / :- >	OTHER
		(103	./sq.in.)	(Specify)
12. STACK DAT	A			
HEIGHT AB	OVE GRADE 175 (feet)	GAS TEMPERAT		7년년 degrees F. average)
INSIDE DI	AMETER AT EXIT 6.5 (feet)	GAS VELOCITY		26.3 et per sec. average)
EXIT GAS	FLOW RATE, SCFM:	AVERAGE 20,087	MAXIMUM	25,091
ARE SAMPL	. ING PORTS AVAILABLE? Ye	es No X (If "Yes"	describe)	
		_		
		•		
,				
13. DESCRIBE F	FUEL TRANSPORT AND STORAGE	• METHODS:		
The by	product oil is press	ured directly to the f tes. No storage is us	furnace pe	riodically
			sea.	
Gas is	pressured via pipeli: age is available.	ne to the furnace.		
	G			
*	<u>;</u>			
14. IS ANY AIR	CONTAMINANT CONTROL DEVI	CE USED IN CONJUNCTION WITH "Form AP 109, must be comp	THIS EQUIPM	IENT? Yes No 🔀
(11 163	a the committee equitality,	Torm Ar 105, mast be comp	receu and at	.cached.)
15. STACK EMIS	SIONS:		1	• · · · · · · · · · · · · · · · · · · ·
		QUANTITY		ALLAN PROTECTION AND ADDRESS OF THE PROTECTION ADDRESS
POLLUTANT	Pou	QUANTITY nds Per Hour (Average)		QUANTITY Tons Per Year
Particulate	0		0	0
Sulfur Dioxide	0		160	702
Nitrogen Oxides	E		4.6	50
Carbon Monoxide			0	0
Hydrofluoric Other - acid	0		12	52
		ORSAT & FUEL ANALYSIS		***************************************
	E =	ESTIMATED AIR POLLUTION	on enginee	RING MANUAL
16. IS THIS IT (If "No" a	EM IN COMPLIANCE WITH ALL	US EPA AP-40 AND FD. APPLICABLE AIR POLLUTION R DIM AP 110 must be complete	ULES AND REC	ULATIONS? Yes 🗓 \o
NAME OF PE	RSON SUBMITTING REPORT	HERBERT E. SIMONS	TITLE TECH	NICAL SUPP.
SICNATURE_	Hafret & Limai			
DATE	March 1, 1977	PHONE	663-7	418



PERMIT APPLICATION FORM AP 102 MANUFACTURING OR PROCESSING EQUIPMENT

NAME OF FIRM						-	
PLANT LOCATI	ON: NORTH O	F THE CIT	Y OF MAI	NDAN, ND			
SOURCE IDENT	IFICATION NUME	BER (From Ite	em 9, Form	AP 100) 9 FCU		_	
TYPE OF UNIT	OR PROCESS (e	e.g. rotary	drier, cup	ola furnace, crusher, pelle	etizer, etc.):		
	ALYTIC CRA	CKING UNI	T		W	-	
Construc MAKE THE L	UMMUS CO	MODEL NO	r APPLIO	CABLE DATE INSTALLED S	ept. 1, 195h	_	
CAPACITY (manufacturer's or designer's guaranteed maximum) 12,500 BSD							
OPERATING CAPACITY (specify units) 23,000 BSD							
component	Я.						
-	TING SCHEDULE:						
NORMAL OPERAT	TING SCHEDULE:	Days p	er week	7 Weeks per yea	ır <u>52</u>		
NORMAL OPERAT	TING SCHEDULE:	Days p	er week _ Peak pro	7 Weeks per year oduction season (if any)	r 52 roduction not	seaso	
NORMAL OPERAT Hours per day	TING SCHEDULE: y 24 ar 8760	Days p	Peak pro	7 Weeks per year duction season (if any) Poors The unit is not	roduction not		
NORMAL OPERAT Hours per day Hours per year Dates of annu	TING SCHEDULE: y 24 ar 8760 ually occurrin	Days p	Peak pro of operati	oduction season (if any) P	roduction not		
NORMAL OPERAT Hours per day Hours per year Dates of annu	TING SCHEDULE: y 24 ar 8760 ually occurrings INTRODUCED	Days p g shut down NTO UNIT OR ocess Weight	Peak pro of operati PROCESS (I	oduction season (if any) Poors The unit is not a	shut down ann		
NORMAL OPERAT Hours per day Hours per year Dates of annu	TING SCHEDULE: y 24 ar 8760 ually occurrings INTRODUCED	Days p g shut down NTO UNIT OR	Peak pro of operati PROCESS (I	oduction season (if any) Poors The unit is not a	Intermittent Operation Only: Average		
NORMAL OPERAT Hours per day Hours per yea Dates of annu RAW MATERIALS	TING SCHEDULE: y 24 8760 ually occurring S INTRODUCED INTRODUCE	Days p g shut down NTO UNIT OR ocess Weight ds Per Hour	Peak pro of operati PROCESS (I Rate	oduction season (if any) Pools The unit is not including solid fuels): 1976 Annual Average Quantity (Specify Units)	Intermittent Operation Only: Average		
NORMAL OPERAT Hours per day Hours per yea Dates of annu RAW MATERIALS Material Reduced	8760 Wally occurring SINTRODUCED INTRODUCED	Days p g shut down NTO UNIT OR ocess Weight ds Per Hour Maximum	Peak pro of operati PROCESS (I Rate	oduction season (if any) Pools The unit is not including solid fuels): 1976 Annual Average Quantity (Specify Units)	Intermittent Operation Only: Average		

		ocess Weight ds Per Hour	Rate		Intermittent Operation
Materia)	Average	Maximum	Design	Annual Average Quantity (Specify Units)	Only: Average Hours/weak
Dry Gas	7120	9669	5442	209 MSCF/Hr	-
C3 - C4	32,119	38,797	24,548	197 Bb1/Hr	-
DLN	32,139	43,983	14,873	152 Bbl/Hr	-

7. PRODUCTS OF UNIT OR PROCESS: (Continued)

	•	ocess Weigh s per Hour	t Rate	1976 Annual Average	Intermitter Operation (
Material	Average	Maximum	Design	Quanity (Specify Units)	Average Hours/week
SHIN MCCO	69,881 85,597	106,263 105,544	49,176	310 Bbl/Hr 264 Bbl/Hr	-
DO COKE	23,470 16,461	34,575 18,783	7,820 11,000	68 Bbl/Hr 17.21 M lb/Hr	-

DEFINITIONS

Reduced Crude	= Bottoms from atmospheric distillation of Crude Cil.
Dry Gas	= Ethane and lighter material contains small % of Propane.
c ₃ - c ₄	= Mixture of Propane, Propene, Butane and Butene.
DLN	= Debutanized Light Naphtha.
SHN	= Stabilized Heavy Naphtha.
MCCO	= Medium Catalytic Cycle Oil.
DO	= Decanted Oil.
Coke	= Carbon with about 7.5 Wt. % hydrogen. Coke is deposited on the catalyst during the cracking reaction and burned off the catalyst in the regenerator thus regenerating the catalyst and

reaction.

providing the heat necessary for the cracking

AIR CONTAMINANTS EMITTED: Amount Emission Point Pollutant Pounds Per Hour Tons Per Year Basis of Estimate	
	l l
I 181.5 8.67 49990 850 43	43.
Stack Height Stack Diameter charged Exit Temp. Velo	Gas elocity (FPS)

15.		r Confession	, WITH NEE APTEICABLE	AIR PULLUITUR RULES	AND REGULATIONS?
	🛛 Yes 🗌	No			
	(If "No," a"Comp	liance Schedule", For	m AP 110 must be con	mpleted and attached))
16.	DOES THE INPUT MY WHICH COULD BECOME The imput mat Describe Storage		OM THIS PROCESS OR USE THE SECOND OF THE PROCESS OF	NIT CONTAIN FINELY Cat	DIVIDED MATERIALS alyst is finely divi mater
	Catalyst: St	ored in two con	e bottom 12'6"	ID x 55' long o	losed vessels
	Stored in two	cone bottom pr	essure vessels.	one 12'6" ID x	69'7" and the
	other 15'6" x	72'10". S (if any) None			
	Type of Material	Particle Size (Average diameter or screen size)	Pile Size (average tons on pile)	Pile Wetted (Yes or No)	Pile Covered (Yes or No)
NAME SIGNA	OF PERSON SUBMITTE	# 6 3	r E. SIMONS	TITLE TECHNICA	L SUPERINTENDENT
DATE	2-28-77	- I COUNTY	PHONE	663-7418	
D/11 L_			FRONE		



PERMIT APPLICATION FORM AP 109 GAS CLEANING EQUIPMENT

1.	NAME OF FIRM OR ORGANIZATION: AMOCO OIL COMPANY	
2.	PLANT LOCATION: NORTH OF THE CITY OF MANDAN, ND	
3.	SOURCE IDENTIFICATION NUMBER (From Item 9, Form AP 100): 9 FCU Cyclones	
4.	TYPE OF GAS CLEANING EQUIPMENT CYCLONE MULTICLONE BAG FILTER	!
	☐ ELECTROSTATIC PRECIPITATOR ☐ WET SCRUBBER	
	X OTHER (Describe) Two Stage Cyclones	
5.	NAME OF MANUFACTURER: Buell Engineering Co Inc 1st Stage 8 No 40 AC 3508 MODEL NO. 2nd Stage 8 No 38 AC 430 DATE INSTALLED May 1967	
6.	APPLICATION (e.g., boiler, kiln) Fluid Catalytic Cracking Unit	
7.	POLLUTANTS REMOVED: Particulates	
	DESIGN EFFICIENCY 99.992 %	
	OPERATING EFFICIENCY 99.996 3 %	 %
	DESCRIBE METHOD USED IN DETERMINING OPERATING EFFICIENCY:	
	Average catalyst flow to regenerator (1976) 13.2 Ton/Min	
	Average catalyst loss to atmosphere (1976) 0.83 Ton/Day	
	(cat losses from cat material balance)	
	100 - (100)(0.83) = 99.9964	***************************************
3.	CAS CONDITIONS: (Design) INLET OUTLET	
	GAS VOLUME (SCFM 60°F., 14.7 psia) 1.8,840 50.946	
	GAS TEMPERATURE (°F.) 1,225 1,280	
	GAS PRESSURE (in. H ₂ O) 512.5 484.8	
	GAS VELOCITY (ft./sec.) 64.4 67.8	
	POLLUTANT CONCENTRATION Particulates 0.52 lb/SCF .000041 lb (Specify pollutant and units of concentration)	<u>:</u> _
•	PRESSURE DROP THROUGH GAS CLEANING DEVICE 27.7 in. Hac.	

and Buell Engineering Co drawing Co480R-	06
	•
	•
	•
11. DESCRIBE COLLECTED AIR CONTAMINANTS DISPOSAL AND/OR	TRANSPORTATION METHODS.
Collected air contaminants are returned t	o the process.
	·
	·
12. IF A STACK TEST HAS BEEN CONDUCTED A COPY OF THE RESU THE TECHNIQUES USED AND THE NAME AND ADDRESS OF THE O ENCLOSED. (No stack test has been conducted.	RGANIZATION PERFORMING THE TEST MUST RE
NAME OF PERSON SUBMITTING APPLICATION H. E. Simons	TIPLE Technical Superintendent
SIGNATURE MEANING & SUMMONNE	True Technical Suberincandene
DATE 4-6-77	PHONE 663-7418

10. PROVIDE A BRIEF DESCRIPTION AND SKETCH OF THE GAS CLEANING DEVICE IF IT IS OF UNUSUAL DESIGN OR USED IN CONJUNCTION WITH OTHER CONTROL DEVICES. SHOW ANY BYPASS OF THE DEVICE, AND SPECIFY

THE CONDITIONS UNDER WHICH THE BYPASS IS USED. ATTACH EXTRA PAGES AS NEEDED.

See attached specifications for design

24 Hour Calculation for October 20, 1976				
		Energy: MMBTU/Day	Lbs SO2/MMBTU	Emissions
Source	Basis*			LBs/ Day
Boilers - Gas	BTUs for Day @ Annual Average Gas Properties	2693	1.64	4400
Boilers - Oil	BTUs for Day @ Month's Average Oil Properties	4616	2.04	9400
Crude Furnace - Gas	BTUs for Month @ Annual Average Properties	2175	5.47	11900
Crude Furnace - Oil	BTUs for Month @ Month's Average Properties	1128	2.04	2300
Ultraformer Furnaces	BTUs for Month @ Average Properties	1614	0.17	270
Alkylation Unit B-1 and B-2 Furnaces	BTUs for Month @ Annual Average Properties	1398	2.1	2900
		Coke: MLbs/Day	Lbs SO2/ MLbs Coke	
FCC Unit	Coke Burn for Day @ Annual Average Wt% S	451	66	29800
·				
		Total Sulfur Dioxide Emissions		60970

^{*} See Attachment 3 for calculation of emission factors.

^{**} Representative of High FCU Operations for 1976.

1977 Sulfur Dioxide Emission Factors

Factors used to calculate 24 hour maximum sulfur dioxide emissions.

Boiler Gas

Based on Yearly Average Hydrogen Sulfide Content and Heat of Combustion (page 7 of 60 in APCPA)) (No gas chromatography data could be located for October. Data for September and November indicates the annual data is representative of the hydrogen sulfide concentration.)

Volume % H2S:

SO2 Emission Factor:

Boiler Fuel Oil

Based on October Average Sulfur Content and Heat of Combustion (back-up to APCPA))

Fuel Oil Properties

9.03 API Gravity 17260 BTU/Lb 8.386 Lb/Gallon 1.76 Wt % Sulfur 6,080,000 BTU/Barrel

Crude Furnace Gas

Based on Yearly Average Hydrogen Sulfide Content and Heat of Combustion (page 16 of 60 in APCPA)) (Includes the Gebitol Acid Gas)

Volume % H2S:

SO2 Emission Factor:

Alkylation Unit Furnace Gas

Based on Yearly Average Hydrogen Sulfide Content and Heat of Combustion (page 28 of 60 in APCPA))

Volume % H2S:

SO2 Emission Factor:

Ultraformer Unit Furnace Gas

Based on Yearly Average Heat of Combustion (page 19 of 60 in APCPA))
Hydrogen Sulfide Content adjusted to 500 ppmv based on Ultraformer sulfur balance.

SO2 Emission Factor:

FCU Coke

Based on Average of 3.3 Wt% Sulfur in Coke (page 32 of 60 in APCPA))

SO2 Emission Factor: